

Appl. No. : 10/614,680
Filed : July 3, 2003

REMARKS

The Abstract has been amended. Claim 16 has been amended. No new matter has been introduced by these amendments. The following addresses the substance of the Office Action.

Abstract

The Examiner has objected to the abstract because of the inclusion of legal phraseology, such as "comprising" and "comprises". The Applicant has amended the Abstract accordingly.

Claim objections

The Examiner has objected to Claims 1-5 (sic) because the preposition "of" is missing between "method" and "claim 13". Applicant has amended Claim 16 that had the preposition missing.

Non-obviousness

The Examiner has rejected Claims 1-13 under 35 USC §103(a) as being unpatentable over GB 1108584 and Ligorati et al. (USP 4,339,605). Specifically, the Examiner has indicated that it would have been obvious to one of ordinary skill in the art that the mesityl oxide present in the phenol fraction of GB'584 upon contact with the acidic cation exchange resin in the presence of water or steam would naturally or necessarily be hydrolyzed to acetone as indicated in Ligorati et al.

To establish a *prima facie* case of obviousness, the PTO must cite one or more references that provide some suggestion or motivation to modify the references to achieve the claimed invention, provide a reasonable expectation of success to achieve the claimed invention, and finally, the cited art must teach or suggest all the claim limitations. *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991). Here, the cited art either taken alone or in combination, fails to provide the required factors.

In a conventional phenol plant according to the Hock process, cumene is converted by oxidation to cumene hydroperoxide which is thereafter cleaved by means of an acidic catalyst (generally sulphuric acid) into phenol and acetone. This cleavage product is worked-up by distillation, providing a crude acetone stream and a crude phenol stream. Both streams are thereafter purified in order to obtain pure acetone and pure phenol. The presently claimed invention relates to the treatment of a waste stream from the acetone purification stream. Thus, according to the presently claimed invention, the high boilers obtained from acetone purification that contain mesityl oxide are treated. The GB'584 relates to the process of treating the crude

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phenol stream. Consequently, the starting material for the acidic treatment according the GB'584 reference is totally different from the starting material as defined by the present Claim 1.

Furthermore, the method of Claim 1 recites that from the waste stream containing mesityl oxide, a mesityl oxide fraction is separated. Thereafter, the mesityl oxide in that separated fraction is concentrated and the concentrated mesityl oxide stream is recycled into the separating device. In contrast thereto, in the GB'584 reference, the phenol fraction containing mesityl oxide is treated with an acidic catalyst in the presence of water, thereby converting the mesityl oxide into lower boiling products that can be more easily separated from phenol. It is not in dispute that it is well known in the art, as evidenced by the references cited by the Examiner, that mesityl oxide can be converted in the presence of water and an acidic catalyst into acetone. However, when applying this common knowledge to the teaching of the GB'584 reference, the mesityl oxide present in the crude phenol fraction is converted into acetone and then acetone can be easily distilled from the phenol fraction, thus reducing the content of unwanted impurities like mesityl oxide in the phenol fraction. Thus, the method described in the GB'584 reference relates to the purification of phenol. However, in the method of GB'584, the direct separation of mesityl oxide from the phenol-containing fraction is not described. On the contrary, the disclosure in the cited reference deals exclusively with the problem that mesityl oxide cannot be separated from phenol; that is the reason why mesityl oxide is first converted into low boilers, and then these low boilers are separated from the phenol fraction. Consequently, within the disclosure of GB'584 there is no step where a mesityl oxide containing fraction is separated from the starting composition as recited in Claim 1.

Furthermore, since according to the teaching of GB'584, the mesityl oxide is converted into low boilers, there is also no possibility to concentrate the mesityl oxide containing fraction and to recycle the concentrated mesityl oxide into the separation device. Consequently, the only feature in the present Claim 1 that is disclosed in the GB'584 reference is that mesityl oxide is converted into low boilers, i.e. acetone, in the presence of water and an acidic catalyst. However, the other limitations in Claim 1 are not disclosed by the cited references.

Additionally, the purpose of the presently claimed invention is convert mesityl oxide present in the waste stream from acetone purification into a valuable product, i.e. acetone, in order to minimize the loss of the valuable material. The purpose of the method described in

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GB'584 is to reduce the impurities in the crude phenol because mesityl oxide is very difficult to separate from phenol.

Therefore, when combining the references cited by the Examiner, a person having ordinary skill in the art would never arrive at the currently claimed method, because such combination would only lead to the knowledge that in the process of the GB'584 reference for removing mesityl oxide from crude phenol stream, the mesityl oxide is converted to acetone, and would not give rise to an expectation that by treating a waste stream obtained from acetone purification by first separating mesityl oxide from the waste stream and then concentrating mesityl oxide and recycling the concentrated mesityl oxide into the separation device, the acetone would be purified.

Moreover, as explained in the Specification as filed, the investment costs for treating a waste stream obtained from the acetone purification can be reduced, and the efficiency of converting unwanted mesityl oxide in the desired end product, i.e. acetone, is improved.

Therefore, because the GB'584 reference deals with a totally different problem, a person skilled in the art would not have been motivated to combine it with Ligorati et al. to arrive at the presently claimed method of recovering acetone from a waste stream from an acetone purification stage. Because of these deficiencies of the cited art, Applicants submit that the PTO has failed to articulate a *prima facie* case of obviousness, and as such, the present rejection of Claims 1-13 under 35 U.S.C. 103 should be withdrawn.

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CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, Applicants request the expeditious allowance of the pending claims. The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call the undersigned at the telephone number below, to discuss such issues.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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